What Is Claimed Is:

1. A failure diagnosis apparatus for diagnosing a failure of an evaporative fuel processing system which includes a fuel tank, a canister having adsorbent for adsorbing evaporative fuel generated in said fuel tank, an air passage connected to said canister and communicating said canister with the atmosphere, a first passage for connecting said canister and said fuel tank, a second passage for connecting said canister and an intake system of an internal combustion engine, a vent shut valve for opening and closing said air passage, and a purge control valve provided in said second passage, said failure diagnosis apparatus comprising:

pressure detecting means for detecting a pressure in said evaporative fuel processing system;

negative pressure reserving means for reserving negative pressure in said intake system during operation of said engine;

engine stoppage detecting means for detecting stoppage of said engine;

negative pressure introducing means for closing said purge control valve and said vent shut valve to introduce the negative pressure reserved in said negative pressure reserving means into said evaporative fuel processing system, when stoppage of said engine is detected by said engine stoppage detecting means; and

determining means for determining whether or not there is a leak in said evaporative fuel processing system, based on the pressure detected by said pressure detecting means during a predetermined determination period after the negative pressure is introduced into said evaporative fuel processing system.

2. The failure diagnosis apparatus according to claim 1, wherein said determining means determines that there is a leak in said evaporative fuel processing system, when an amount of change in the pressure detected by said pressure detecting means during the predetermined determination period, is greater than a determination threshold value.

3. The failure diagnosis apparatus according to claim 2, further comprising fuel amount detecting means for detecting a remaining fuel amount in said fuel tank, wherein the determination threshold value is set according to the remaining fuel amount detected by said fuel amount detecting means.

4. The failure diagnosis apparatus according to claim 1, wherein said determination means calculates a change rate parameter indicative of a rate of change in the pressure detected by said pressure detecting means during the predetermined determination period, and performs the determination based on a rate of change in the change rate parameter.

5. The failure diagnosis apparatus according to claim 4, wherein said determination means statistically processes detected values of the change rate parameter and detection timings of the detected values of the change rate parameter, to calculate an inclination of a regression line indicative of a relation between the detected values of the change rate parameter and the detection timings thereof, and performs the determination based on the calculated inclination.

6. A failure diagnosis method for diagnosing a failure of an evaporative fuel processing system which includes a fuel tank, a canister having adsorbent for adsorbing evaporative fuel generated in said fuel tank, an air passage connected to said canister and communicating said canister with the atmosphere, a first passage for connecting said canister and said fuel tank, a second passage for connecting said canister and an intake system of an internal combustion engine, a vent shut valve for opening and closing said air passage, and a purge control valve provided in said second passage, said failure diagnosis method comprising the steps of:

a) reserving negative pressure in said intake system during operation of said engine;

b) detecting stoppage of said engine;

c) closing said purge control valve and said vent shut valve to introduce the reserved negative pressure into said evaporative fuel processing system, when stoppage of said engine is detected;

d) detecting a pressure in said evaporative fuel processing system; and

e) determining whether or not there is a leak in said evaporative fuel processing system, based on the detected pressure during a predetermined determination period after the negative pressure is introduced into said evaporative fuel processing system.

7. The failure diagnosis method according to claim 6, wherein it is determined that there is a leak in said evaporative fuel processing system, when an amount of change in the detected pressure during the predetermined determination period, is greater than a determination threshold value.

8. The failure diagnosis method according to claim 7, further comprising the step of detecting a remaining fuel amount in said fuel tank, wherein the determination threshold value is set according to the detected remaining fuel amount.

9. The failure diagnosis method according to claim 6, wherein a change rate parameter indicative of a rate of change in the pressure detected during the predetermined determination period is calculated, and the determination is performed based on a rate of change in the change rate parameter.

10. The failure diagnosis method according to claim 9, wherein detected values of the change rate parameter and detection timings of the detected values of the change rate parameter are statistically processed, to calculate an inclination of a regression line indicative of a relation between

the detected values of the change rate parameter and the detection timings thereof, and the determination is performed based on the calculated inclination.

11. A computer program for causing a computer to carry out a failure diagnosis method for diagnosing a failure of an evaporative fuel processing system which includes a fuel tank, a canister having adsorbent for adsorbing evaporative fuel generated in said fuel tank, an air passage connected to said canister and communicating said canister with the atmosphere, a first passage for connecting said canister and said fuel tank, a second passage for connecting said canister and an intake system of an internal combustion engine, a vent shut valve for opening and closing said air passage, and a purge control valve provided in said second passage, said failure diagnosis method comprising the steps of:

a) reserving negative pressure in said intake system during operation of said engine;

b) detecting stoppage of said engine;

c) closing said purge control valve and said vent shut valve to introduce the reserved negative pressure into said evaporative fuel processing system, when stoppage of said engine is detected;

d) detecting a pressure in said evaporative fuel processing system; and

e) determining whether or not there is a leak in said evaporative fuel processing system, based on the detected pressure during a predetermined determination period after the negative pressure is introduced into said evaporative fuel processing system.

12. The computer program according to claim 11, wherein it is determined that there is a leak in said evaporative fuel processing system, when an amount of change in the detected pressure during the predetermined determination period, is greater than a determination threshold value.

13. The computer program according to claim 12, wherein the failure diagnosis method further comprises the step of detecting a remaining fuel amount in said fuel tank, and the determination threshold value is set according to the detected remaining fuel amount.

14. The computer program according to claim 11, wherein a change rate parameter indicative of a rate of change in the pressure detected during the predetermined determination period is calculated, and the determination is performed based on a rate of change in the change rate parameter.

15. The computer program according to claim 14, wherein detected values of the change rate parameter and detection timings of the detected values of the change rate parameter are statistically processed, to calculate an inclination of a regression line indicative of a relation between the detected values of the change rate parameter and the detection timings thereof, and the determination is performed based on the calculated inclination.